

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON THE REVERSE OF THE FORM.)

I. (a) PLAINTIFF

CENTRAL SPRINKLER CORPORATION
451 North Cannon Avenue
Lansdale, Pennsylvania 19446

(b) County of Residence of First Listed Plaintiff Montgomery County, PA
 (EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorney's (Firm Name, Address, and Telephone Number)

Eric Kraeutler
John V. Gorman
Kenneth L. Racowski
MORGAN, LEWIS & BOCKIUS LLP
1701 Market Street
Philadelphia, PA 19103-2921

DEFENDANT

THE VIKING CORPORATION
210 North Industrial Park
Hastings, Michigan 49058

County of Residence of First Listed Defendant Barry County, Michigan
 (IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE LAND INVOLVED

Attorneys (If Known)

II. BASIS OF JURISDICTION (Place an "X" in One Box Only)

- ☐ 1 U.S. Government Plaintiff ☒ 3 Federal Question (U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (Place an "X" in One Box for Plaintiff and One Box for Defendant)

- | | PTF | DEF | | PTF | DEF |
|-----------------------------------------|----------------------------|----------------------------|---------------------------------------------------------------|----------------------------|----------------------------|
| Citizen of This State | <input type="checkbox"/> 1 | <input type="checkbox"/> 1 | Incorporated or Principal Place of Business In This State | <input type="checkbox"/> 4 | <input type="checkbox"/> 4 |
| Citizen of Another State | <input type="checkbox"/> 2 | <input type="checkbox"/> 2 | Incorporated and Principal Place of Business In Another State | <input type="checkbox"/> 5 | <input type="checkbox"/> 5 |
| Citizen or Subject of a Foreign Country | <input type="checkbox"/> 3 | <input type="checkbox"/> 3 | Foreign Nation | <input type="checkbox"/> 6 | <input type="checkbox"/> 6 |

IV. NATURE OF SUIT (Place an "X" in One Box Only)

CONTRACT	TORTS	FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES	
<input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 151 Medicare Act <input type="checkbox"/> 152 Recovery of Defaulted Student Loans (Excl. Veterans) <input type="checkbox"/> 153 Recovery of Overpayment of Veteran's Benefits <input type="checkbox"/> 160 Stockholders' Suits <input type="checkbox"/> 190 Other Contract <input type="checkbox"/> 195 Contract Product Liability <input type="checkbox"/> 196 Franchise	PERSONAL INJURY <input type="checkbox"/> 310 Airplane <input type="checkbox"/> 315 Airplane Product Liability <input type="checkbox"/> 320 Assault, Libel & Slander <input type="checkbox"/> 330 Federal Employers' Liability <input type="checkbox"/> 340 Marine <input type="checkbox"/> 345 Marine Product Liability <input type="checkbox"/> 350 Motor Vehicle <input type="checkbox"/> 355 Motor Vehicle Product Liability <input type="checkbox"/> 360 Other Personal Injury	<input type="checkbox"/> 362 Personal Injury - Med Malpractice <input type="checkbox"/> 365 Personal Injury - Product Liability <input type="checkbox"/> 368 Asbestos Personal Injury Product Liability PERSONAL PROPERTY <input type="checkbox"/> 370 Other Fraud <input type="checkbox"/> 371 Truth in Lending <input type="checkbox"/> 380 Other Personal Property Damage <input type="checkbox"/> 385 Property Damage Product Liability	<input type="checkbox"/> 610 Agriculture <input type="checkbox"/> 620 Other Food & Drug <input type="checkbox"/> 625 Drug Related Seizure of Property 21 USC 881 <input type="checkbox"/> 630 Liquor Laws <input type="checkbox"/> 640 R.R. & Truck <input type="checkbox"/> 650 Airline Regs. <input type="checkbox"/> 660 Occupational Safety/Health <input type="checkbox"/> 690 Other LABOR <input type="checkbox"/> 710 Fair Labor Standards Act <input type="checkbox"/> 720 Labor/Mgmt. Relations <input type="checkbox"/> 730 Labor/Mgmt. Reporting & Disclosure Act <input type="checkbox"/> 740 Railway Labor Act <input type="checkbox"/> 790 Other Labor Litigation <input type="checkbox"/> 791 Empl. Ret. Inc. Security Act	<input type="checkbox"/> 422 Appeal 28 USC 158 <input type="checkbox"/> 423 Withdrawal 28 USC 157 PROPERTY RIGHTS <input type="checkbox"/> 820 Copyrights <input checked="" type="checkbox"/> 830 Patent <input type="checkbox"/> 840 Trademark SOCIAL SECURITY <input type="checkbox"/> 861 HIA (1395ff) <input type="checkbox"/> 862 Black Lung (923) <input type="checkbox"/> 863 DIWC/DIWW (405(g)) <input type="checkbox"/> 864 SSID Title XVI <input type="checkbox"/> 865 RSI (405(g)) FEDERAL TAX SUITS <input type="checkbox"/> 870 Taxes (U.S. Plaintiff or Defendant) <input type="checkbox"/> 871 IRS - Third Party 26 USC 7609	<input type="checkbox"/> 400 State Reapportionment <input type="checkbox"/> 410 Antitrust <input type="checkbox"/> 430 Banks and Banking <input type="checkbox"/> 450 Commerce <input type="checkbox"/> 460 Deportation <input type="checkbox"/> 470 Racketeer Influenced and Corrupt Organizations <input type="checkbox"/> 480 Consumer Credit <input type="checkbox"/> 490 Cable/Sat TV <input type="checkbox"/> 810 Selective Service <input type="checkbox"/> 850 Securities/Commodities/Exchange <input type="checkbox"/> 875 Customer Challenge 12 USC 3410 <input type="checkbox"/> 890 Other Statutory Actions <input type="checkbox"/> 891 Agricultural Acts <input type="checkbox"/> 892 Economic Stabilization Act <input type="checkbox"/> 893 Environmental Matters <input type="checkbox"/> 894 Energy Allocation Act <input type="checkbox"/> 895 Freedom of Information Act <input type="checkbox"/> 900 Appeal of Fee Determination Under Equal Access to Justice <input type="checkbox"/> 950 Constitutionality of State Statutes
REAL PROPERTY <input type="checkbox"/> 210 Land Condemnation <input type="checkbox"/> 220 Foreclosure <input type="checkbox"/> 230 Rent Lease & Ejectment <input type="checkbox"/> 240 Torts to Land <input type="checkbox"/> 245 Tort Product Liability <input type="checkbox"/> 290 All Other Real Property	CIVIL RIGHTS <input type="checkbox"/> 441 Voting <input type="checkbox"/> 442 Employment <input type="checkbox"/> 443 Housing/Accommodations <input type="checkbox"/> 444 Welfare <input type="checkbox"/> 445 Amer. w/Disabilities - Employment <input type="checkbox"/> 446 Amer. w/Disabilities - Other <input type="checkbox"/> 440 Other Civil Rights	PRISONER PETITIONS <input type="checkbox"/> 510 Motions to Vacate Sentence Habeas Corpus: <input type="checkbox"/> 530 General <input type="checkbox"/> 535 Death Penalty <input type="checkbox"/> 540 Mandamus & Other <input type="checkbox"/> 550 Civil Rights <input type="checkbox"/> 555 Prison Condition			

V. ORIGIN (Place an "X" in One Box Only)

- ☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from another district (specify) ☐ 6 Multidistrict Litigation ☐ 7 Appeal to District Judge from Magistrate Judgment

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity):
 35 U.S.C. 1 et seq.

Brief description of cause: Patent Infringement

VII. REQUESTED IN COMPLAINT:

☐ CHECK IF THIS IS A CLASS ACTION UNDER F.R.C.P. 23

DEMAND \$

CHECK YES only if demanded in complaint
 JURY DEMAND: ☒ Yes ☐ No

VIII. RELATED CASE(S) IF ANY

(See instructions):

JUDGE

DOCKET NUMBER

DATE: February 2, 2007

SIGNATURE OF ATTORNEY OF RECORD

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF PENNSYLVANIA - DESIGNATION FORM to be used by counsel to indicate the category of the case for the purpose of assignment to appropriate calendar.

Address of Plaintiff: Central Sprinkler Corporation, 451 North Cannon Avenue, Lansdale, Pennsylvania 19446

Address of Defendant: The Viking Corporation, 210 North Industrial Park, Hastings, Michigan 49058

Place of Accident, Incident or Transaction: United States, including Pennsylvania

(Use Reverse Side For Additional Space)

Does this civil action involve a nongovernmental corporate party with any parent corporation and any publicly held corporation owning 10% or more of its stock? (Attach two copies of the Disclosure Statement Form in accordance with Fed.R.Civ.P. 7.1(a))

Yes ☐ No ☒

Does this case involve multidistrict litigation possibilities:

Yes ☐ No ☒

RELATED CASE, IF ANY:

Case Number: _____ Judge _____ Date Terminated: _____

Civil cases are deemed related when yes is answered to any of the following questions:

1. Is this case related to property included in an earlier numbered suit pending or within one year previously terminated action in this court?

Yes ☐ No ☒

2. Does this case involve the same issue of fact or grow out of the same transaction as a prior suit pending or within one year previously terminated action in this court?

Yes ☐ No ☒

3. Does this case involve the validity or infringement of a patent already in suit or any earlier numbered case pending or within one year previously terminated action in this court?

Yes ☐ No ☒

CIVIL: (Place 4 in ONE CATEGORY ONLY)

A. Federal Question Cases

1. ☐ Indemnity Contract, Marine Contract, and All Other Contracts

2. ☐ FELA

3. ☐ Jones Act-Personal Injury

4. ☐ Antitrust

5. ☒ Patent

6. ☐ Labor-Management Relations

7. ☐ Civil Rights

8. ☐ Habeas Corpus

9. ☐ Securities Act(s) Cases

10. ☐ Social Security Review Cases

11. ☐ All other Federal Question Cases – Lanham Act, Copyright Act

B. Diversity Jurisdiction Cases:

1. ☐ Insurance Contract and Other Contracts

2. ☐ Airplane Personal Injury

3. ☐ Assault, Defamation

4. ☐ Marine Personal Injury

5. ☐ Motor Vehicle Personal Injury

6. ☐ Other Personal Injury (Please specify)

7. ☐ Products Liability

8. ☐ Products Liability – Asbestos

9. ☐ All other Diversity Cases

(Please specify) Tortious Interference, Commercial Disparagement

ARBITRATION CERTIFICATION

(Check appropriate Category)

I, John V. Gorman counsel of record do hereby certify:

Pursuant to Local Civil Rule 53.2, Section 3(c)(2), that to the best of my knowledge and belief, the damages recoverable in this civil action case exceed the sum of \$150,000.00 exclusive of interest and costs:

Relief other than monetary damages is sought.

DATE: February 2, 2007

John V. Gorman
Attorney-at-Law

Attorney I.D. # 80631

NOTE: A trial de novo will be a trial by jury only if there has been compliance with F.R.C.P. 38.

I certify that, to my knowledge, the within case is not related to any case now pending or within one year previously terminated action in this court except as noted above.

DATE: February 2, 2007

John V. Gorman
Attorney-at-Law

Attorney I.D. # 80631

UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF PENNSYLVANIA - DESIGNATION FORM to be used by counsel to indicate the category of the case for the purpose of assignment to appropriate calendar.

Address of Plaintiff: Central Sprinkler Corporation, 451 North Cannon Avenue, Lansdale, Pennsylvania 19446

Address of Defendant: The Viking Corporation, 210 North Industrial Park, Hastings, Michigan 49058

Place of Accident, Incident or Transaction: United States, including Pennsylvania

(Use Reverse Side For Additional Space)

Does this civil action involve a nongovernmental corporate party with any parent corporation and any publicly held corporation owning 10% or more of its stock? (Attach two copies of the Disclosure Statement Form in accordance with Fed.R.Civ.P. 7.1(a))

Yes ☐ No ☒

Does this case involve multidistrict litigation possibilities:

Yes ☐ No ☒

RELATED CASE, IF ANY:

Case Number: _____ Judge _____ Date Terminated: _____

Civil cases are deemed related when yes is answered to any of the following questions:

1. Is this case related to property included in an earlier numbered suit pending or within one year previously terminated action in this court?

Yes ☐ No ☒

2. Does this case involve the same issue of fact or grow out of the same transaction as a prior suit pending or within one year previously terminated action in this court?

Yes ☐ No ☒

3. Does this case involve the validity or infringement of a patent already in suit or any earlier numbered case pending or within one year previously terminated action in this court?

Yes ☐ No ☒

CIVIL: (Place 4 in ONE CATEGORY ONLY)

A. Federal Question Cases

1. ☐ Indemnity Contract, Marine Contract, and All Other Contracts
2. ☐ FELA
3. ☐ Jones Act-Personal Injury
4. ☐ Antitrust
5. ☒ Patent
6. ☐ Labor-Management Relations
7. ☐ Civil Rights
8. ☐ Habeas Corpus
9. ☐ Securities Act(s) Cases
10. ☐ Social Security Review Cases

B. Diversity Jurisdiction Cases:

1. ☐ Insurance Contract and Other Contracts
2. ☐ Airplane Personal Injury
3. ☐ Assault, Defamation
4. ☐ Marine Personal Injury
5. ☐ Motor Vehicle Personal Injury
6. ☐ Other Personal Injury (Please specify)
7. ☐ Products Liability
8. ☐ Products Liability - Asbestos
9. ☐ All other Diversity Cases

(Please specify) Tortious Interference, Commercial Disparagement

11. ☐ All other Federal Question Cases - Lanham Act, Copyright Act

ARBITRATION CERTIFICATION

(Check appropriate Category)

I, John V. Gorman counsel of record do hereby certify:

Pursuant to Local Civil Rule 53.2, Section 3(c)(2), that to the best of my knowledge and belief, the damages recoverable in this civil action case exceed the sum of \$150,000.00 exclusive of interest and costs:

Relief other than monetary damages is sought.

DATE: February 2, 2007

Attorney-at-Law

Attorney I.D. # 80631

NOTE: A trial de novo will be a trial by jury only if there has been compliance with F.R.C.P. 38.

I certify that, to my knowledge, the within case is not related to any case now pending or within one year previously terminated action in this court except as noted above.

DATE: February 2, 2007

Attorney-at-Law

Attorney I.D. # 80631

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

CASE MANAGEMENT TRACK DESIGNATION FORM

CENTRAL SPRINKLER CORPORATION
451 North Cannon Avenue
Lansdale, Pennsylvania 19446

Plaintiff,

v.

THE VIKING CORPORATION
210 North Industrial Park
Hastings, Michigan 49058

Defendants.

CIVIL ACTION
NO. _____

In accordance with the Civil Justice Expense and Delay Reduction Plan of this court, counsel for plaintiff shall complete a case Management Track Designation Form in all civil cases at the time of filing the complaint and serve a copy on all defendants. (See § 1:03 of the plan set forth on the reverse side of this form.) In the event that a defendant does not agree with the plaintiff regarding said designation, that defendant shall, with its first appearance, submit to the clerk of court and serve on the plaintiff and all other parties, a case management track designation form specifying the track to which that defendant believes the case should be assigned.

SELECT ONE OF THE FOLLOWING CASE MANAGEMENT TRACKS:

- (a) Habeas Corpus - Cases brought under 28 U.S.C. §2241 through §2255. ☐
- (b) Social Security - Cases requesting review of a decision of the Secretary of Health and Human Services denying plaintiff Social Security Benefits. ☐
- (c) Arbitration - Cases required to be designated for arbitration under Local Civil Rule 53.2. ☐
- (d) Asbestos - Cases involving claims for personal injury or property damage from exposure to asbestos. ☐
- (e) Special Management - Cases that do not fall into tracks (a) through (d) that are commonly referred to as complex and that need special or intense management by the court. (See reverse side of this form for a detailed explanation of special management cases.) ☒
- (f) Standard Management - Cases that do not fall into any one of the other tracks. ☐

February 2, 2007

Date

215.963.5000
Telephone

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Attorney For Plaintiff

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kracowski@morganlewis.com

Email Address

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

CENTRAL SPRINKLER CORPORATION
451 North Cannon Avenue
Lansdale, Pennsylvania 19446

Plaintiff,

V.

THE VIKING CORPORATION
210 North Industrial Park
Hastings, Michigan 49058

Defendant.

CIVIL ACTION

No.: _____

JURY TRIAL DEMANDED

COMPLAINT

Plaintiff CENTRAL SPRINKLER CORPORATION (“Central”), through its attorneys, alleges for its complaint against Defendant THE VIKING CORPORATION (“Viking”), upon knowledge with respect to its own actions and upon information and belief with respect to the actions of others:

Jurisdiction and Venue

1. This Court has original jurisdiction over the subject matter of this action pursuant to the provisions of Title 28, United States Code (“U.S.C.”) §§ 1331, and 1338(a), this action arising under the Patent Laws of the United States, Title 35 U.S.C. § 1, et seq. There also exists jurisdiction pursuant to § 1332(a).

2. Defendant Viking is subject to personal jurisdiction in this district because, *inter alia*, it directly and through its agents: regularly does, solicits, and transacts business in the Eastern District of Pennsylvania and in the State of Pennsylvania.

3. Venue is proper in this district under 28 U.S.C. §§ 1391(b) and 1400(b) because a substantial part of the events or omissions giving rise to the claims occurred in this district.

The Parties

4. Plaintiff Central is a corporation organized and existing under the laws of the State of Pennsylvania, having its principal place of business at 451 North Cannon Avenue, Lansdale, Pennsylvania 19446.

5. Plaintiff Central is the assignee of record of United States Patent No. 4,976,320 (“the ‘320 Patent”).

6. Upon information and belief, Defendant Viking is a corporation organized and existing under the laws of the State of Michigan, having its principal place of business at 210 North Industrial Park, Hastings, Michigan 49058.

7. Defendant Viking transacts business in this judicial district, such as by selling or offering to sell products in the Eastern District of Pennsylvania, including Viking’s Model VK456 Concealed Sprinkler.

COUNT I

Infringement of United States Patent No. 4,976,320

8. Plaintiff hereby incorporates by reference the allegations contained in paragraphs 1 through 7 as if fully set forth herein.

9. On December 11, 1990, United States Patent No. 4,976,320 entitled “Concealed Sprinkler With Drop Down Deflector Assembly, And Improved Fusible Valve Lever Assembly” was duly and legally issued to Plaintiff Central, as assignee. A copy of the ‘320 Patent is attached hereto as Exhibit A.

10. Possessing all substantial rights to the '320 Patent and the '320 Patent being in full force and effect, Plaintiff Central has the right to sue for infringement thereof.

11. Upon information and belief, Defendant Viking is infringing the '320 Patent, either directly or contributorily, by making, using, selling, offering for sale, importing, or supplying concealed sprinklers, including the Viking Model VK456 Concealed Sprinkler, or actively inducing the infringement of the '320 Patent by making, using, selling, or offering for sale such sprinklers, all in violation of 35 U.S.C. § 271 et seq., and will continue to do so unless enjoined by this Court.

12. By reason of Defendant Viking's acts of infringement, Plaintiff Central has suffered and is suffering damages, including impairment of the value of the '320 Patent, in an amount yet to be determined.

13. Defendant Viking's acts of infringement are causing irreparable harm to Plaintiff Central and will continue to cause irreparable harm unless enjoined by this Court.

14. Upon information and belief, Defendant Viking's continued infringement of the '320 Patent is willful and justifies a trebling of damages pursuant to 35 U.S.C. § 284. Further, this is an exceptional case supporting an award of reasonable attorneys' fees pursuant to 35 U.S.C. § 285.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Central prays the Court for the following relief:

1. That Defendant Viking, its officers, directors, employees, agents, representatives, attorneys, and all persons acting or claiming to act on its behalf or under its direction or authority and all persons acting in concert or in participation with Viking, be enjoined during the pendency of this action, and thereafter perpetually from:

- (a) making, using, offering for sale, selling, or supplying any and all infringing products in violation of the '320 Patent, and
- (b) inducing others to violate the '320 Patent.

2. That Defendant Viking be required to account for and pay over to Plaintiff Central the cumulative damages sustained by Plaintiff Central by reason of Defendant Viking's unlawful acts of patent infringement, herein alleged, that the amount of the recovery be increased as provided by law, up to three times, and that interest be awarded to Plaintiff Central.

3. That Plaintiff Central be awarded its reasonable costs and attorneys' fees.

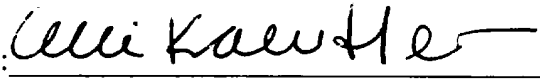
4. That Plaintiff Central have such other and further legal or equitable relief as this Court may deem necessary and appropriate.

JURY TRIAL DEMAND

Plaintiff Central hereby demands a trial by jury for each and every issue so permitted by law and statute.

Respectfully Submitted,

Dated: February 2, 2007

BY: 
Eric Kraeutler (Pa. I.D. No. 32189)
John V. Gorman (Pa. I.D. No. 80631)
Kenneth L. Racowski (Pa. I.D. No. 90514)
MORGAN, LEWIS & BOCKIUS LLP
1701 Market Street
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215.963.5000

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA**

CENTRAL SPRINKLER CORPORTION
451 North Cannon Avenue
Lansdale, Pennsylvania 19446

Plaintiff,

v.

THE VIKING CORPORATION
210 North Industrial Park
Hastings, Michigan 49058

Defendant.

CIVIL ACTION

No.: _____

**JURY TRIAL
DEMANDED**

PLAINTIFF'S DISCLOSURE STATEMENT

Pursuant to Federal Rule of Civil Procedure 7.1, Plaintiff CENTRAL SPRINKLER CORPORATION ("Central"), certifies that it is an indirect corporate subsidiary of Tyco International Ltd., securities of which are publicly traded on the New York Stock Exchange.

MORGAN, LEWIS & BOCKIUS LLP

Dated: February 2, 2007

BY: _____



Eric Kraeutler (Pa. I.D. No. 32189)
John V. Gorman (Pa. I.D. No. 80631)
Kenneth L. Racowski (Pa. I.D. No. 90514)
Morgan, Lewis & Bockius LLP
1701 Market Street
Philadelphia, PA 19103-2921
215.963.5000

EXHIBIT A

United States Patent [19]**Polan**[11] **Patent Number:** **4,976,320**[45] **Date of Patent:** **Dec. 11, 1990**

[54] **CONCEALED SPRINKLER WITH DROP DOWN DEFLECTOR ASSEMBLY, AND IMPROVED FUSIBLE VALVE LEVER ASSEMBLY**

4,618,002 10/1986 Mears 169/37
 4,766,961 8/1988 Macie 169/38
 4,785,888 11/1988 Blum et al. 169/42

FOREIGN PATENT DOCUMENTS

648027 9/1962 Canada 169/38
 20421 of 1890 United Kingdom .
 313 of 1895 United Kingdom .
 343806 2/1931 United Kingdom .
 346984 4/1931 United Kingdom 169/39
 1359857 7/1974 United Kingdom 169/38

[75] **Inventor:** George S. Polan, Harleysville, Pa.

[73] **Assignee:** Central Sprinkler Corporation,
 Lansdale, Pa.

[21] **Appl. No.:** 356,740

[22] **Filed:** May 25, 1989

[51] **Int. Cl.³** A62C 37/08

[52] **U.S. Cl.** 169/39; 169/37;
 169/38; 169/40

[58] **Field of Search** 169/37, 40, 38, 39,
 169/42, 90

[56]

References Cited**U.S. PATENT DOCUMENTS**

506,704 10/1893 Lynde 169/40
 506,929 10/1893 Newton 169/39
 1,816,016 7/1931 Knight 169/42
 2,558,450 6/1951 Martin 169/37
 3,195,647 7/1965 Campbell et al. 169/37
 3,633,676 1/1972 Gloeckler 169/40
 3,756,321 9/1973 Gloeckler 169/40
 4,014,388 3/1977 Anderson 169/37
 4,015,665 4/1977 Simons et al. 169/40
 4,105,076 8/1978 Simons et al. 169/38
 4,217,960 8/1980 Miyazaki 169/38
 4,596,289 6/1986 Johnson 169/37

Primary Examiner—Sherman Basinger

Assistant Examiner—Christopher P. Ellis

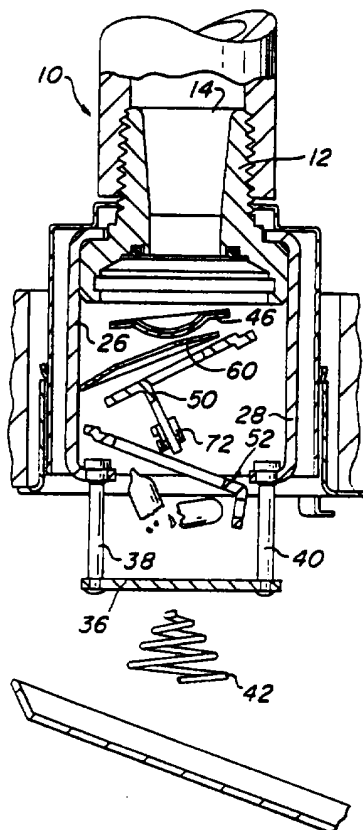
Attorney, Agent, or Firm—Panitch Schwarze Jacobs &
 Nadel

[57]

ABSTRACT

A concealed sprinkler with drop down deflector assembly includes a pair of frame arms which resemble a tuning-fork, there being a gap between the free end portions of the arms. As a result, the arms are not subject to assembly loads or system pressure loads. The drop down deflector assembly is mounted on the end portions of the arms. A preferred valve assembly includes a valve and a compound lever arrangement for holding a rigid thermal responsive element, such as a frangible glass bulb, and for adjusting compressive preload on the valve without loading the frame arms.

12 Claims, 3 Drawing Sheets



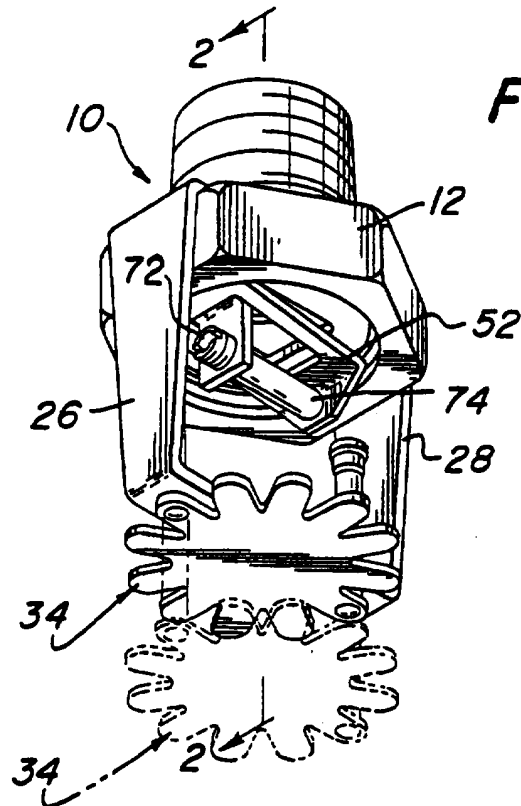


FIG. 1

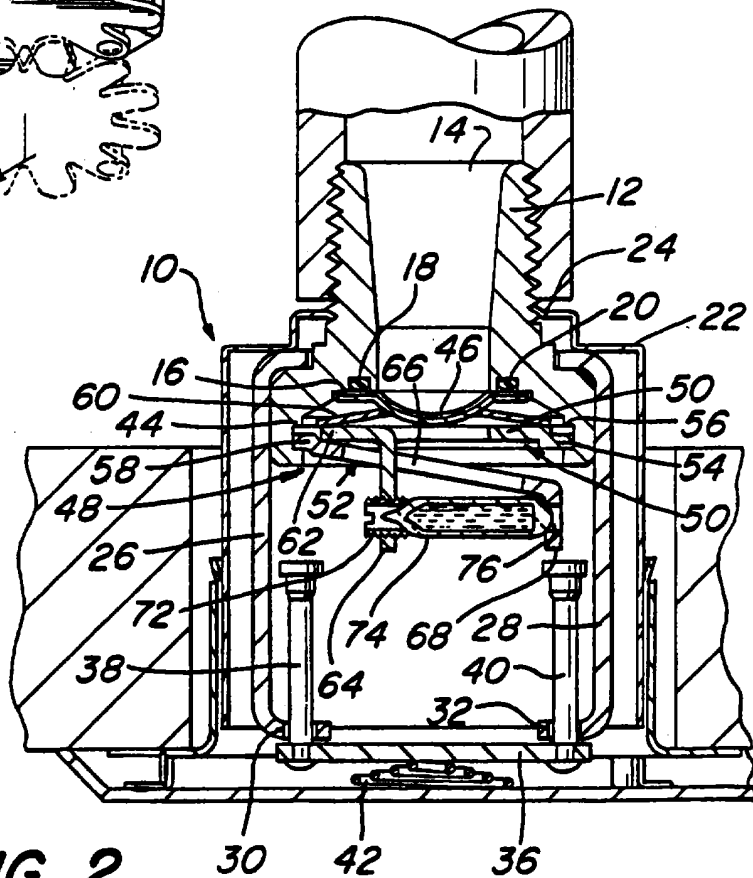


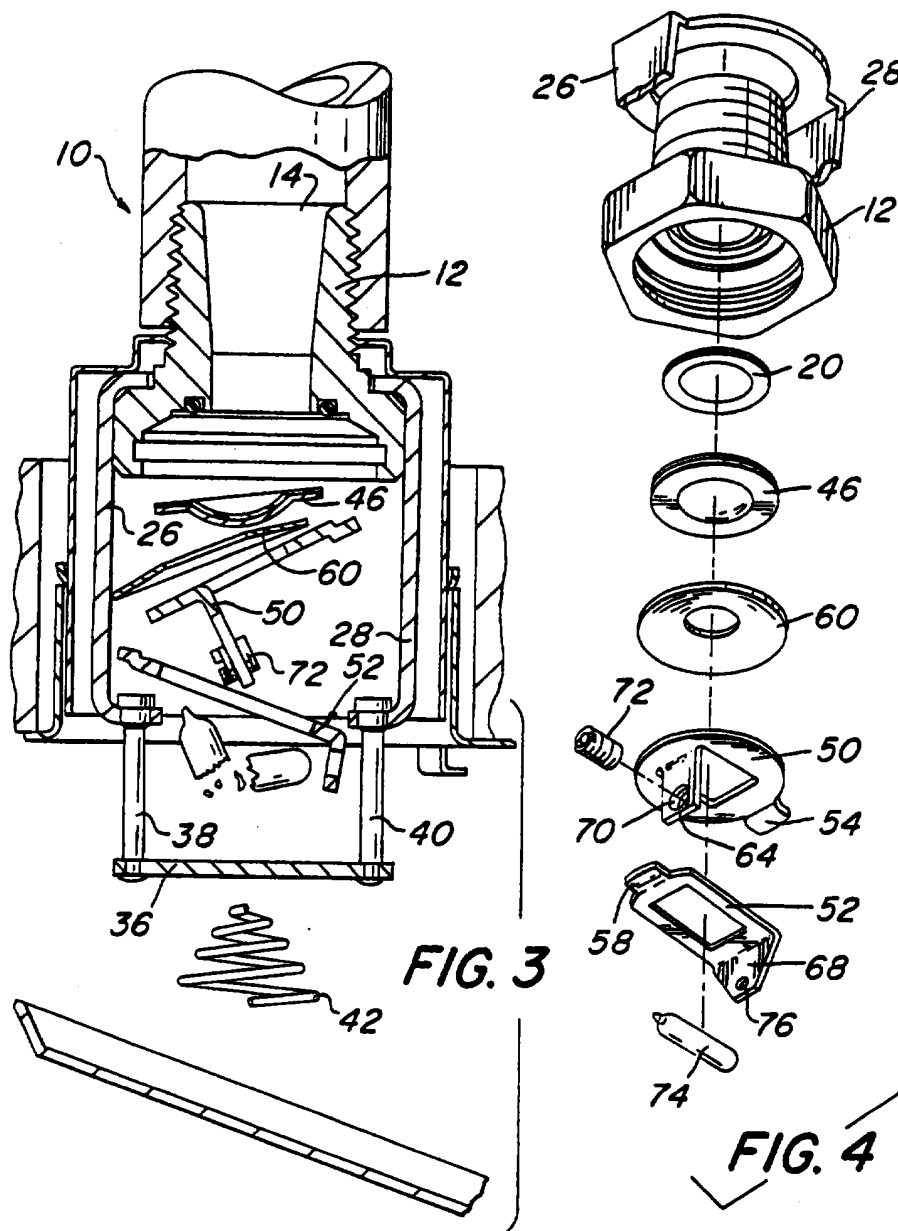
FIG. 2

U.S. Patent

Dec. 11, 1990

Sheet 2 of 3

4,976,320

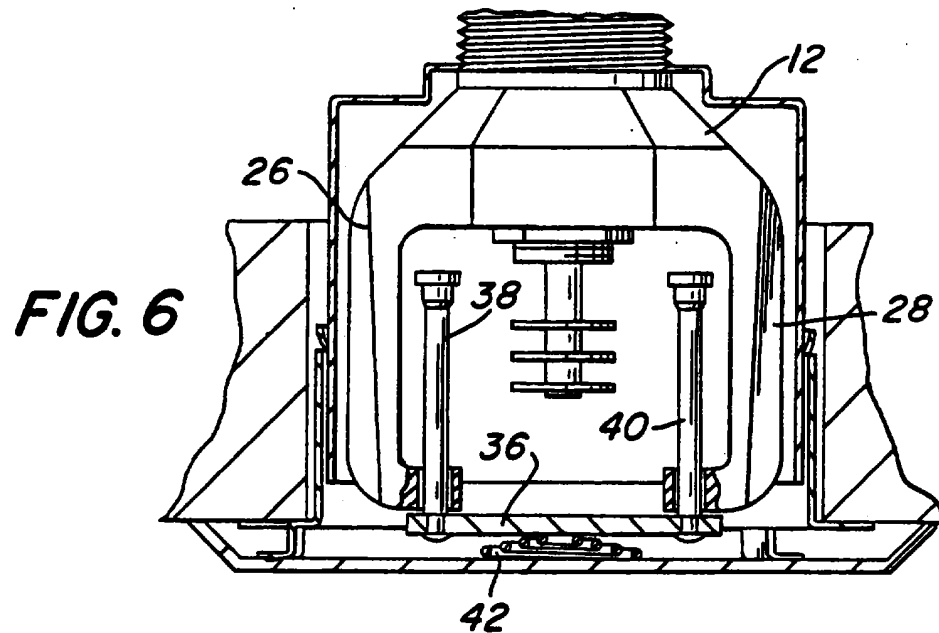
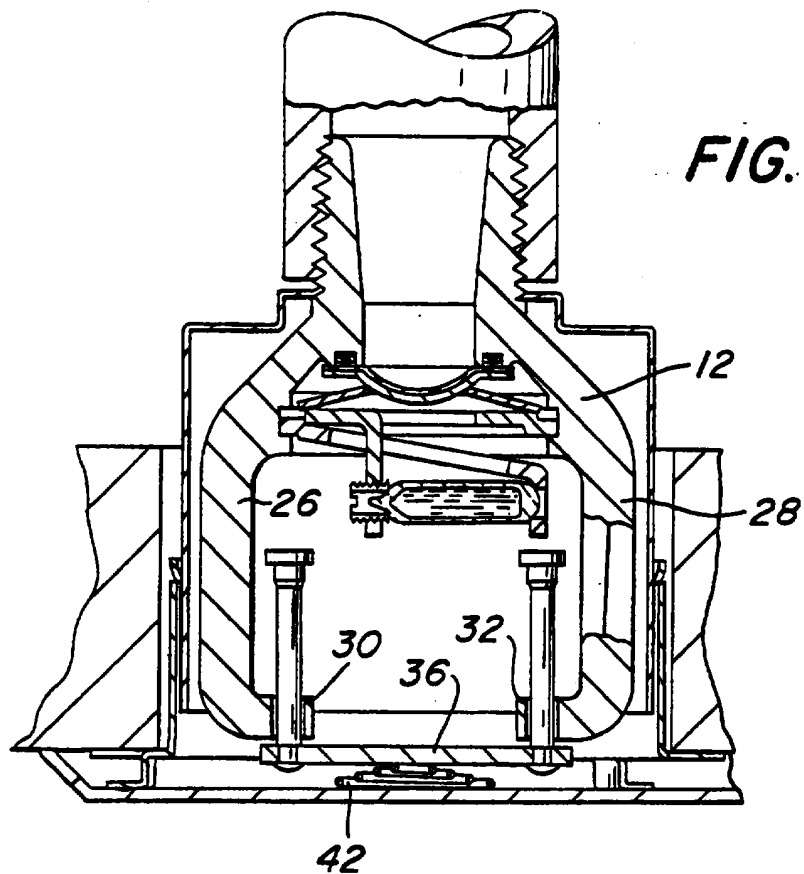


U.S. Patent

Dec. 11, 1990

Sheet 3 of 3

4,976,320



CONCEALED SPRINKLER WITH DROP DOWN DEFLECTOR ASSEMBLY, AND IMPROVED FUSIBLE VALVE LEVER ASSEMBLY

FIELD OF THE INVENTION

The invention relates to the field of fire sprinkler equipment, specifically, concealed sprinklers, sprinklers having drop down deflector assemblies, sprinklers utilizing a frangible glass bulb as the thermal responsive element, and sprinklers including a mechanism for adjusting the compressive pre-load on the sprinkler valve.

BACKGROUND OF THE INVENTION

Sprinklers employing drop down deflector assemblies are well-known. See U.S. Pat. Nos. 4,217,960 and 4,014,388. U.S. Pat. No. 4,217,960 discloses a concealed type sprinkler having a slotted cylindrical frame 7 threaded on a body 1. A deflector 14 is mounted on guide pins 12 which extend through bores in the frame bottom wall. A valve assembly 10 is secured to the deflector and loaded by a lever mechanism between the body outlet and frame bottom wall. The frame bottom wall is provided with a central opening through which the valve assembly can drop with the deflector. U.S. Pat. No. 4,014,388 discloses a concealed type sprinkler having a spring urged drop down deflector 17 whose guide pins 15, 16 extend through bores in frame arms 5, 6. The frame arms are part of a yoke frame integral with a body 1 and are loaded by a thermal element 8 between the body outlet and a compression screw 24.

U.S. Pat. No. 2,558,450 discloses a concealed type sprinkler having a yoke (26, 27) shaped as a tuning fork with an arm 62 bridging the yoke bight. Arm 62 is provided with a compression screw 49 and is mounted on the yoke at grooves 65 or on balls 71.

U.S. Pat. Nos. 4,596,289, 4,105,076, 4,015,665, 3,756,321 and 3,633,676 also disclose drop down deflectors. In these patents, the deflector is mounted on a pair of guide pins along the flange portion of a sprinkler body. U.S. Pat. No. 4,596,289 discloses a drop down valve 32 and deflector 22 mounted on guide pins 40, 42 along a sprinkler body flange 24. The flange can be separately manufactured and secured to the sprinkler body 12. U.S. Pat. No. 4,105,076 discloses a drop down valve 5 and deflector 12 mounted on guide pins 14 along a sprinkler body 16. U.S. Pat. No. 4,015,665 shows the same drop down valve and deflector construction as in U.S. Pat. No. 4,105,076. U.S. Pat. No. 3,756,321 discloses a drop down deflector 33 mounted on guide pins 31 along a sprinkler body flange 22. U.S. Pat. No. 3,633,676 discloses a drop down deflector 34 mounted on guide pins 29 along a sprinkler body flange.

U.S. Pat. Nos. 4,766,961 and 4,618,002 also disclose drop down deflectors mounted on guide pins along a sprinkler body flange. U.S. Pat. No. 4,766,961 discloses a drop down valve 13 and a deflector 16 mounted on guide pins 17 along a sprinkler body flange 19. U.S. Pat. No. 4,618,002 discloses a drop down valve 30 and deflector 36 mounted on guide pins 38 along a sprinkler body flange 12.

Various sprinkler valve lever mechanisms are also well-known. For example U.K. patent No. 313 discloses a triple compound lever arrangement wherein a link g and lever h are fulcrumed along an annular shoulder in the sprinkler housing. Apparently, the lever is pivoted by the advance of an adjustment screw 1. U.K. patent No. 20,421 discloses a double compound lever arrange-

ment wherein an upper lever f is pivotably mounted on a lip b, of a sprinkler cover, a lower lever g is pivotably mounted on the same lip b', the other end of the lever f is fulcrumed on the lever g, and the lever g is supported at its other end on a washer i coupled to a soldered tube arrangement k, 1 outside the sprinkler body. U.K. patent No. 343,806 discloses the general concept of a pair of fulcrum arms a, b captured by a clamp e. The arms hold a sprinkler bulb d in compression. Canadian patent No. 648,027 discloses a pair of lever arms 20 which: retain a valve cover plate 16 in position while holding a bulb 22 in compression. The lever arms are fulcrumed in the cover plate. U.K. patent No. 1,359,857 discloses a control valve for an open sprinkler head. A valve plug 24 is pre-loaded by a pivotable strut and a cam 30. A glass bulb 38 is pre-loaded between strut 35 and opposing (pivotable) strut 36. Strut 35 is pivotable about a notch 34 in a housing arm 28. Strut 36 is pivotable about a screw 41 in a housing 29. U.K. patent No. 347,984 discloses a bulb h pre-loaded between arms a1, b1 of a balanced pair of levers a, b. U.S. Pat. No. 3,195,647 discloses a pair of levers 40 which hold a fusible link 38 in tension while maintaining a valve 22 sealed against a sprinkler valve seat. The amount of tension exerted on the fusible link is set by deforming a portion of the sprinkler frame by a ran 50.

The present invention provides a solution to the problem of providing for adjustable compressive pre-load of a valve in a sprinkler utilizing a rigid thermal responsive element, such as a frangible glass bulb, without loading the frame arms. As a result, the frame arms may be made lighter or of less bulk without affecting sprinkler operation.

SUMMARY OF THE INVENTION

A concealed sprinkler with drop down deflector assembly comprises a body having a passage with an inlet and an outlet for conducting flow of pressurized fluid. A frame is connected to the body, and the frame has opposed arms. Each arm depends from the body and has a free end portion. The free end portions of the arms are separated by a gap so that the arms are not subjected to assembly loads or system pressure loads. A drop down deflector assembly is mounted on the free end portions of the arms so as to be displaceable from a first elevation to a second, lower elevation. The gap permits undistorted water column flow directly to the deflector assembly.

A valve assembly is provided for sealing the passage outlet. Preferably, the valve assembly includes a compound lever assembly having expandable jaws for holding a rigid thermal responsive element. The compound lever assembly is moveable upwardly against a valve upon expansion of the jaws. Means are provided for adjusting compressive pre-load on the valve by expanding the jaws to cause the compound lever assembly to move upwardly against the valve.

For the purpose of illustrating the invention, there is shown in the drawings forms which are presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective of a concealed sprinkler with drop down deflector assembly according to the present

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invention wherein the sprinkler body and frame are discrete units.

FIG. 2 is a vertical section taken along 2—2 in FIG. 1 showing the sprinkler prior to activation.

FIG. 3 is a vertical section taken along 2—2 in FIG. 1 showing the sprinkler after activation.

FIG. 4 is an exploded isometric of the components of the sprinkler shown in FIG. 1.

FIG. 5 is a vertical section of a sprinkler according to the present invention wherein the body and frame are a single cast unit.

FIG. 6 is a vertical section of a sprinkler according to the present invention utilizing a conventional valve assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, wherein like numerals indicate like elements, there is shown in FIG. 1 a sprinkler according to the present invention designated generally as 10. Sprinkler 10 includes a body 12 having a passage 14 with an inlet and an outlet for conducting flow of pressurized fluid. A valve seat 16 is formed on the body at the region of the outlet. An annular groove 18 is formed in the valve seat, and an O-ring seal 20 is lodged in the groove.

A separate, discrete frame 22, formed of stamped metal, has a threaded collar 24 and a pair of opposed arms 26, 28. The frame is threaded onto body 12 so that arms 26, 28 depend from the body. Each arm has a free end portion 30, 32. The free end portions of the arms are separated by a gap whereby the arms are not subjected to assembly loads or system pressure loads.

A drop down deflector assembly 34 is mounted on the free end portions 30, 32 of the arms 26, 28 so as to be displaceable from a first elevation shown in solid lines in FIG. 1 (prior to activation of the sprinkler) to a second, lower elevation shown in phantom in FIG. 1 (after activation of the sprinkler). The drop down deflector assembly includes a deflector plate 36 coupled to a pair of guide pins 38, 40 journaled in the free end portions of the arms. A spring 42 is provided beneath the deflector plate so as to yieldingly urge the deflector assembly to the first elevation (solid line position in FIG. 1). The spring is located between the deflector plate 36 and a ceiling cover which drops away at elevated temperatures. The elevated temperatures cause a (lower temperature rated) solder joint between the cover plate and a support ring to melt prior to activation of a valve assembly 44. The cover plate and support ring are conventional elements of the concealed type sprinkler.

The valve assembly 44 seals the outlet of passage 14. The valve assembly includes a disc-shaped Mylar™ coated valve 46 with a central concavity. A compressive pre-load is exerted on valve 46, urging the valve against the valve seat 16, to seal the outlet of passage 14.

The valve assembly includes a compound lever assembly 48. The lever assembly includes expandable jaws which capture a thermal responsive element such as a frangible glass bulb therebetween. The compound lever assembly is moveable upwardly against the valve 46 upon expansion of the jaws as described hereinafter. The compressive pre-load on the valve is adjusted by expanding the jaws to cause the compound lever assembly to move upwardly against the valve.

More particularly, the compound lever assembly includes an upper lever 50 and a lower lever 52. Upper lever 50 is pivotably mounted at an end portion 54

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thereof in an annular groove 56 formed in body 12. Lower lever 52 is pivotably mounted at an end portion 58 thereof in the same annular groove. An annular spring washer 60 is disposed between valve 46 and lever 50 although, if desired, the spring washer can be dispensed with. Upper lever 50 is supported along an end portion 62 thereof by lower lever 52 such that upward pivoting movement of the lower lever causes upward pivoting movement of the upper lever thereby exerting a compressive pre-load on valve 46 via spring washer 60. Upper lever 50 is provided with a down-turned tab or jaw 64 which extends through an opening 66 in lower lever 52. The lower lever is provided with a down-turned end portion or jaw 68. Jaw 64 is provided with a threaded opening 70 for accepting a load screw 72. The threaded opening is sized so as to receive the jet end portion of a rigid thermal responsive element 74 in the form of a frangible glass bulb containing a heat expandable fluid such as alcohol. Jaw 68 is provided with an opening 76 for receiving the other end of element 74. Advancing load screw 72 in opening 70 (to the right in FIG. 1) displaces the thermal responsive element 74 so as to cause the jaws 64, 68 to expand whereby the lower lever 52 pivots upwardly. As a result, upper lever 50 is pivoted upwardly against valve 46 thereby increasing the compressive pre-load on the valve. To reduce the compressive pre-load on the valve, the load screw 72 is backed off (to the left in FIG. 1) so as to close the jaws incrementally.

It should be readily appreciated that the compound lever assembly of the present invention enables adjustment of the compressive pre-load on valve 46 over a relatively wide range with relatively little displacement of the load screw 72.

The compound lever assembly 48 of the present invention is preferred for capturing the thermal responsive element 74, and for adjusting the compressive pre-load on valve 46, because it is particularly suited for use with the frame arm arrangement of the invention wherein the frame arms are not loaded, i.e., wherein the frame arms are not used to capture the thermal responsive element or to pre-load the valve.

Referring to FIG. 5, there is shown a vertical section of an alternate embodiment of the invention wherein the body 12 and frame 22 are a single cast unit. The structure and operation of the embodiment shown in FIG. 5 is otherwise identical to that previously described.

Although the invention has been described in terms of a pair of frame arms arranged so as to avoid subjecting the arms to loads, in conjunction with a preferred valve assembly and compound lever arrangement, it should be understood that the preferred frame arm arrangement and preferred valve assembly may be utilized separately. For example, in FIG. 6, there is shown a sprinkler utilizing the frame arm arrangement of the present invention, including the drop down deflector assembly, but a conventional valve assembly.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification, as indicating the scope of the invention.

I claim:

1. Concealed sprinkler with drop down deflector assembly, comprising:

a body having a passage with an inlet and an outlet for conducting flow of pressurized fluid,

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- a valve assembly for sealing the passage outlet,
- a frame connected to the body and having opposed arms, each arm depending from the body and having a free end portion, the free end portions of the arms being separated by a gap so that the arms are not subjected to assembly loads or system pressure loads, and
- a drop down deflector assembly mounted on said free end portions of said arms so as to be displaceable from a first elevation to a second, lower elevation.
- 2. Concealed sprinkler according to claim 1 wherein the gap between said free end portions of said arms is greater than the inner diameter of said passage at its outlet.
- 3. Concealed sprinkler according to claim 3 wherein said body and frame are a single cast unit.
- 4. Concealed sprinkler according to claim 1 wherein said body and frame are discrete units provided with means for fastening the frame and
- 5. Concealed sprinkler according to claim 1 wherein said drop down deflector assembly includes a deflector plate coupled to a pair of guide pins journaled in said free end portions of said arms, and means for yieldingly urging said deflector plate to said first elevation.
- 6. A sprinkler, comprising:
 - a body having a passage with an inlet and an outlet for conducting flow of pressurized fluid, said body having a valve seat at the region of the outlet,
 - a valve assembly for sealing the passage outlet including a compound lever assembly, said compound lever assembly including expandable jaws for holding a rigid thermal responsive element therebetween, said compound lever assembly being moveable upwardly against a valve upon expansion of the jaws, and means for adjusting compressive pre-load on the valve by expanding the jaws to cause the compound lever assembly to move upwardly against the valve.
- 7. A sprinkler, comprising:
 - a body having a passage with an inlet and an outlet for conducting flow of pressurized fluid, said body having a valve seat at the region of the outlet,
 - a valve assembly for sealing the passage outlet including an upper lever and a lower lever, each pivotably mounted at an end portion thereof to the body, a valve supported by said upper lever, the upper lever being supported along another end portion thereof by the lower lever such that upward pivoting movement of said lower lever causes upward pivoting movement of said upper lever against the valve, said upper and lower levers having jaws for holding a rigid thermal responsive element therebetween, said jaws being expandable upon upward pivoting movement of the lower lever, and means for adjusting compressive pre-load on said valve against the valve seat by expanding said jaws to cause said upper lever to pivot upwardly against the valve.
- 8. A sprinkler according to claim 6 or claim 7 wherein said means for adjusting compressive pre-load

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includes means for displacing said thermal responsive element held by said jaws.

9. A sprinkler according to claim 6 including a spring washer between said compound lever assembly and valve.

10. A sprinkler according to claim 7 including a spring washer between said upper lever and said valve.

11. A sprinkler with drop down deflector assembly, comprising:

- a body having a passage with an inlet and an outlet for conducting flow of pressurized fluid,
- a valve assembly for sealing the passage outlet,
- a frame connected to the body and having opposed arms, each arm depending from the body and having a free end portion, the arm free end portions being separated by a gap so that the arms are not subjected to assembly loads or system pressure loads,
- a drop down deflector assembly mounted on said free end portions of said arms so as to be displaceable from a first elevation to a second, lower elevation,
- said valve assembly including a compound lever assembly, said compound lever assembly including expandable jaws for holding a rigid thermal responsive element therebetween, said compound lever assembly being moveable upwardly against a valve upon expansion of the jaws, and means for adjusting compressive pre-load on the valve by expanding the jaws to cause the compound lever assembly to move upwardly against the valve.

12. A sprinkler with drop down deflector assembly, comprising:

- a body having a passage with an inlet and an outlet for conducting flow of pressurized fluid,
- a valve assembly for sealing the passage outlet,
- a frame connected to the body and having opposed arms, each arm depending from the body and having a free end portion, the arm free end portions being separated by a gap so that the arms are not subjected to assembly loads or system pressure loads,
- a drop down deflector assembly mounted on said free end portions of said arms so as to be displaceable from a first elevation to a second, lower elevation,
- said valve assembly including an upper lever and a lower lever each pivotably mounted at an end portion thereof to the body, a valve supported by said upper lever, the upper lever being supported along another end portion thereof by the lower lever such that upward pivoting movement of said lower lever causes upward pivoting movement of said upper lever against the valve, said upper and lower levers having jaws for holding a rigid thermal responsive element therebetween, said jaws being expandable upon upward pivoting movement of said lower lever, and means for adjusting compressive pre-load on said valve against the valve seat by expanding said jaws to cause said upper lever to pivot upwardly against the valve.

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